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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,279	10/15/2001	Genji Imai	011382	1120

23850 7590 07/16/2003

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EXAMINER

THORNTON, YVETTE C

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 07/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/976,279

Applicant(s)

IMAI, GENJI

Examiner

Yvette C. Thornton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This is written in reference to application number 09/976279 filed on October 15, 2001 which was published as US 2002/0068237 A1 on June 6, 2002.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The Information Disclosure Statement filed on April 28, 2003 has been entered the Taiwanese Office Action dated February 25, 2003 has not been considered because an English translation was not provided.

Claim Rejections - 35 USC § 102

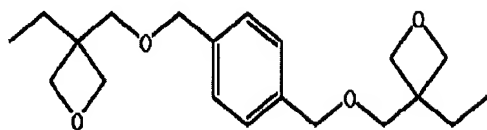
3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

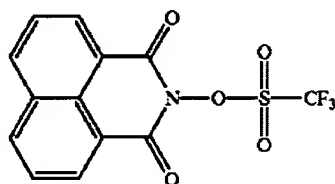
(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-2, 4 and 6-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Imai et al. (US 6,140,025 A) with Aldrich Handbook of Chemicals and Laboratory Equipment cited to show inherent properties. In example 3, Imai exemplifies a photosensitive composition comprising 50 parts of a photocurable resin; 50 parts of an oxetane compound represented by the following formula:

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; 10 parts of a light acid generator represented by the



following formula:

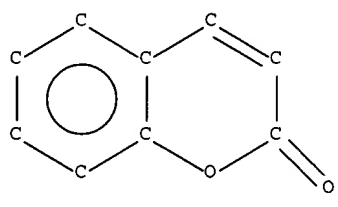
; and 1 part of a photosensitizer (trade name

LS-148, made by Mitsui Chemicals, Inc., a coumarin dye compound). The said resin is a polymeric binder obtained by reacting methyl methacrylate/butyl acrylate/acrylic acid 40:40:20 with glycidyl methacrylate (see ex. 1, c. 13, l. 50-c. 14, l. 42; ex. 2, c. 14, l. 45-c. 15, l. 9; and ex. 3, c. 15, l. 10-60). A photosensitive solution was prepared by dissolving the taught components in propylene glycol monomethyl ether organic solvent. The said solution was applied onto a copper plated and glass fiber reinforced epoxy substrate in a dark room by a bar coater and dried at 60°C for 10 minutes to form a resist film a dry film having a thickness of 5 μ m. Afterward, a cover coat was applied to the surface of the resist film (ex. 1, c. 13, l. 50-c. 14, l. 42). Imai teaches that the said cover sheet is preferably removed after the exposure of the photosensitive material and before the developing treatment (c. 9, l. 45-c. 10, l. 9). Next, the surface of the substrate having the resist film was irradiated with a sodium lamp for 24 hours. Next, the substrate was heated at 120°C for 30 seconds in a dark room and then immersed at 30°C for 1 minute in 1% aqueous sodium carbonate solution as a developing solution (c. 15, l. 38-48). The said sodium lamp emits in the range of approximately 589 nm (c. 2, l. 41-44; fig. 1). As a result, of exposure with the sodium lamp, the resist film was completely dissolved in the aqueous developing solution. Moreover, the

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substrate having the resist film was irradiated with an argon laser (488 nm) in the presence of a sodium lamp through a negative mask, developed and dried to form an excellent printed resist imaged film. Also the said resist film was irradiated with a xenon lamp and second harmonic (532 nm) of a YAG-SHG laser to obtained similar results (c. 15, l. 49-59).

5. It is the examiner's position that the taught light acid generator meets the limitation of the claimed photoacid generator. The taught photosensitizer meets the limitation of a photosensitizer, which is a benzopyran condensed ring compound. Imai fails to give the specific structure of the coumarin dye used in example 3, however, coumarin dyes inherently



contain the structure: COc1cc2c(c1)c(=O)oc2, which is a derivative of benzopyran (see Aldrich, page 453), thereby meeting the limitations of the instant claims. (See also, Imai c. 8, l. 26-43) Furthermore, exposure with a sodium lamp, argon laser, xenon laser and YAG-SHG laser all constitute irradiation with visible light (c. 11, l. 66-c. 12, l. 15). The comprising language of the instant claims does not prohibit the presence of additional light sources. The taught cover layer meets the limitation of a support film, which is removed after irradiation. Imai also teaches that the photosensitive composition of the present invention can be used as an organic solvent type composition or an aqueous type composition (c. 9, l. 25-28; c. 10, l. 10-34). Although example 3 is an organic solvent type composition, one of ordinary skill in the art could really envisage an aqueous type composition comprising the components of example 3.

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6. The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

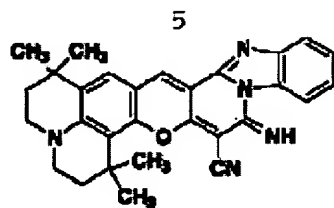
Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

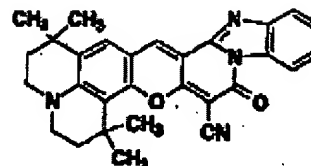
8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Imai (US 6,140,025 A) with Aldrich as applied to claims 1-2, 4 and 6-10 above, and further in view of Makoto et al. (JP 09-138502 A, machine translation). Imai as discussed above teaches all the limitations of the instant claims except it fails to teach a photosensitizer having the specific structure of instant claim 3. Makoto teaches a series of benzopyran ring condensation compound guided from a 3-benzimidazolyl-2-imino coumarin compounds which show photosensitization ability to light with a wavelength of 500 nm or more (p. 0008). Specific compounds include formulae 5-6, 8-10 and 15 (p. 0016-0026). Formula 5 having the

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structure:

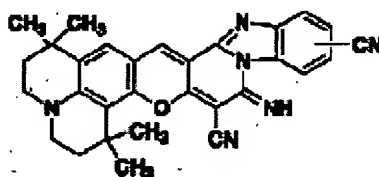
(5) meets the limitations of claimed formula (1) when



Y=NH, R1=H and R2=H. Formula 6 having the structure:

(6)

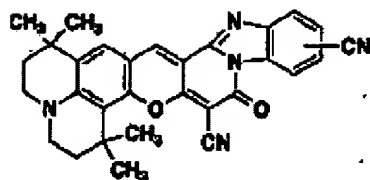
meets the limitations of claimed formula (1) when Y=O, R1=H and R2=H. Formula 8



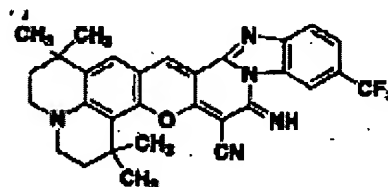
having the structure:

(8) meets the limitations of claimed

formula (1) when Y=NH, R1=H and R2=CN. Formula 9 having the structure:



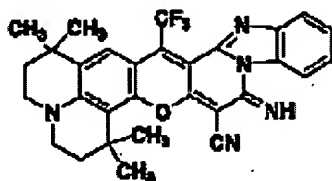
(9) meets the limitations of claimed formula (1) when Y=O,



R1=H and R2=CN. Formula 10 having the structure:

(10)

meets the limitations of claimed formula (1) when Y=NH, R1=H and R2=CF3. Formula 15



having the structure:

(15) meets the limitations of claimed

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formula (1) when $Y=NH$, $R1=CF_3$ and $R2=H$. One of ordinary skill in the art would have been motivated by the teachings of Makoto to substitute any one of the benzopyran ring condensed compounds of formulae 5-6, 8-10 and 15 for the exemplified coumarin dye of example 3 of Imai in order to improve the photosensitizing ability of the taught composition to visible light greater than 500 nm.

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Imai (US 6,140,025 A) with Aldrich as applied to claims 1-2, 4 and 6-10 above, and further in view of Uno et al. (US 6,277,541 B1). Imai as discussed above teaches all the limitations of the instant claims except it fails to teach a photoacid proliferating agent (D) as set forth in instant claim 5. Imai does however teach that additives can be added to the taught composition such as adhesion improvers, plasticizers and fluidity adjusters (c. 8, l. 8-19). Uno teaches that cyclic acid anhydrides, phenols and organic acids are added to photosensitive compositions to increase sensitivity and improve development properties. Suitable examples of organic acids include sulfonic acids such as p-toluenesulfonic acid, dodecylbenzenesulfonic acid and carboxylic acids such as benzoic acid, phthalic acid and 1,4-cyclohexene-2,2-dicarboxylic acid (c. 26, l. 39-65). One of ordinary skill in the art would have been motivated by the teachings of Uno to incorporate an organic acid into the exemplified composition of Imai in order to improve sensitivity and development properties. It is the examiner's position that the taught organic acids meet the limitation of the claimed organic acid ester of instant claim 5.

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Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Urano et al. (US 6,033,826 A) which teaches a polymer and resist material
- Okamoto et al. (US 5,801,212 A) which teaches a photopolymerization composition containing a sensitizing dye and a titanocene compound.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 703-305-0589. The examiner can normally be reached on Monday-Thursday 8-6:30.

12. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet C. Baxter can be reached on 703-308-2303. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

13. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1495.


Yvette Clarke Thornton
Junior Examiner
Art Unit 1752

yct
July 10, 2003